2402 Michelson Drive
Suite 210
Irvine, CA 92612

T: 949-752-7040
F: 949-752-7049

MacPherson Kwok Chen & Heid LLP

Date:	November 2, 2005		
To:	Examiner Tsukerman, Larisa Z.	Fax Telephone #:	571-273-8300
	Board of Patent Appeals and Interferences	Office Telephone #:	
From:	David S. Park	Date Sent:	
Subject:	Appellant: Kazama, Toshio Serial No. 10/070,290 Filing Date: February 28, 2002	Time Sent:	
Client/File:	AB-1215 US	Fax Operator:	

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant(s):	Kazama, Toshio		
Assignee:	NHK Spring Co., Ltd.		
Title:	Conductive Contact Member Having A Contact Surface Protected From Solder Deposition		
Serial No.:	10/070,290	Filing Date:	February 28, 2002
Examiner:	Tsukerman, Larisa Z.	Group Art Unit:	2833
Docket No.:	AB-1215 US		

Irvine, California
November 2, 2005

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Dated: November 2, 2005

Tina Kavanaugh

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LAW OFFICES OF
MACPHERSON KWOK CHEN
& HEID LLP
1762 TECHNOLOGY DRIVE
SUITE 226
SAN JOSE, CA 95110
(949) 752-7040
FAX (408) 392-9262

MacPherson Kwok Chen & Heid LLP
1762 Technology Drive
Suite 226
San Jose, California 95110
Telephone: (949) 752-7040
Fax: (408) 392-9262

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Appellant(s):	Kazama, Toshio		
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APPEAL BRIEF UNDER 37 C.F.R. § 41.37

Dear Sirs:

In response to the Office Action dated May 19, 2005 (the "Office Action") which reopened prosecution after the filing of a prior Appeal Brief dated January 24, 2005, Appellant submits this Appeal Brief. The previously paid Appeal Brief fee should be applied for this Appeal Brief. The Commissioner is hereby authorized to deduct any other amounts from Deposit Account No. 50-2257 required for this Appeal Brief and to credit any amounts overpaid to Deposit Account No. 50-2257. If an extension of time is required for timely filing of the enclosed document(s) after all papers filed with this transmittal have been considered, an extension of time is hereby requested.

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MacPHERSON KWOK
CHEN & HEID LLP

2402 Michelson Dr.
SUITE 210
Irvine, CA 92612
(949) 752-7040
FAX (949) 752-7049

I. REAL PARTY IN INTEREST

The real party in interest is the assignee, NHK Spring Co., Ltd., as named in the caption above.

II. RELATED APPEALS AND INTERFERENCES

Based on information and belief, there are no appeals or interferences that could directly affect or be directly affected by or have a bearing on the decision by the Board of Patent Appeals in the pending appeal.

III. STATUS OF CLAIMS

Claims 1-2 and 4-10 are pending, of which Claims 1-2 and 4-10 stand rejected. Claim 3 was canceled. Claims 1-2 and 4-10 are the appealed claims. Please see the Appendix for a listing of the pending claims.

IV. STATUS OF AMENDMENTS

On June 21, 2004, Appellant submitted a response to the March 19, 2004 Office Action. Claims 1, 9, and 10 were lastly amended in that response and the amendments were entered as per the Final Office Action dated August 24, 2004 (the "Final Office Action"). No further amendments were made after the Final Office Action.

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CHEN & HEID LLP

2402 Michelson Dr.
SUITE 210
Irvine, CA 92612
(949) 752-7040
FAX (949) 750-7049

V. SUMMARY OF CLAIMED SUBJECT MATTER

Conventionally, when a contact probe has been repeatedly applied to an object to be tested that is made of solder or covered by solder, the solder from such object to be tested/contacted may gradually transfer and deposit on the contact surface of the contact probe over time. Such deposition of solder on the contact surface is not desirable as it prevents a stable conductance of electricity between the object and the contact surface of the contact probe and decreases testing efficiency (e.g., Specification, page 1, lines 4-24).

The present invention is directed toward a contact member that is applied to an object including solid solder for testing and other applications in the field of semiconductor devices. The present invention prevents such contamination of the contact member by placing a layer of gold added with silver over the contact surface of the contact member. In one embodiment, a conductive contact member (e.g., FIG. 1, item 3) is provided for establishing a temporary electric contact by being applied under a resilient force to an object to be contacted that includes solid solder (e.g., FIGS. 1, 5, 9, item 7a), the contact member comprising: a layer of highly electrically conductive material resistant to solder deposition and essentially consisting of gold containing a small amount of silver (e.g., FIGS. 2-4, items 8a and 8b; FIG. 7, item 18; FIG. 9, item 18'), the layer being formed at least over a conductive contact part of the conductive contact member so that the conductive contact part of said conductive contact member may not be contaminated by deposition of solder from the object to be contacted (Claim 1; e.g., Specification, page 2, lines 12-22).

The layer of the conductive contact member may be formed by plating in one example (Claim 2; e.g., Specification, page 6, line 25, page 7, lines 11-12). In yet another example, silver may be added to gold by 0.01% to 8% in the layer (Claim 4; e.g., Specification, page 2, lines 18-20, page 6, line 25).

The conductive contact member may take several forms, including but not limited to, a coil (e.g., Specification, page 4, line 25; FIG. 1, item 3), a needle member having a pointed end (e.g., Specification, page 10, lines 1-4; FIG. 6, item 14), and a rod member having a flat end (e.g., Specification, page 11, lines 11-13; FIG. 9, item 14a') (Claim 5). The conductive contact member may also be in the form of a compression coil spring, and the solder resistant layer may be formed around a coil wire forming the coil spring (Claim 7; e.g., Specification, page 6, line 23-page 7, line 10). The conductive contact member may further be in the form of a compression coil spring having a contact part consisting of closely wound turns of a coil

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2402 Michelson Dr.
SUITE 210
Irvine, CA 92612
(949) 752-7040
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wire, and the solder resistant layer may be formed over an outer surface of the closely wound turns of the coil wire (Claim 8; e.g., Specification, page 7, lines 11-20). The conductive contact member may also be made of steel (Claim 6; e.g., Specification, page 5, line 1).

The present invention also provides a conductive contact member comprising a layer of highly electrically conductive material resistant to solder deposition and essentially consisting of an alloy of gold added with silver, the layer being formed at least over a conductive contact part of said conductive contact member so that said conductive contact part of said conductive contact member may not be contaminated by deposition of solder from said object to be contacted (Claim 9; e.g., Specification, page 2, lines 12-22; FIGS. 2-4, items 8a and 8b; FIG. 7, item 18; FIG. 9, item 18').

In yet another embodiment, the present invention provides a conductive contact member comprising a layer of highly electrically conductive material resistant to solder deposition and essentially consisting of a homogeneous mixture of gold added with silver, the layer being formed at least over a conductive contact part of said conductive contact member so that said conductive contact part of said conductive contact member may not be contaminated by deposition of solder from said object to be contacted (Claim 10; e.g., Specification, page 2, lines 12-22; FIGS. 2-4, items 8a and 8b; FIG. 7, item 18; FIG. 9, item 18').

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

1. Claims 1-2, 4-7, and 9-10 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Chang (U.S. Patent No. 5,500,605) in view of Onodera et al. (U.S. Patent No. 6,133,537 hereinafter "Onodera").

2. Claim 2 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Chang and Onodera, as applied to Claim 1 above, and further in view of DiRenzo (U.S. Patent No. 3,599,326).

3. Claim 8 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Chang in view of Onodera, as applied to Claims 1 and 7 above, and further in view of Loranger et al. (U.S. Patent No. 5,791,914 hereinafter "Loranger").

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MacPHERSON KWOK
CHEN & HEID LLP

2402 Michelson Dr.
SUITE 210
Irvine, CA 92612
(949) 752-7040
FAX (949) 752-7049

VII. ARGUMENT

1. Chang in view of Onodera

Claims 1-2, 4-7, and 9-10 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Chang in view of Onodera.

In rejecting the claims in the May 19, 2005 Office Action, the Examiner wrote in part:

> **In regard to claims 1, 9 and 10**, Chang discloses a conductive contact member 25 **for** establishing a temporary electric contact by being applied under a resilient force (member 22 and spring 24 and spring 30) to an object 10 to be contacted that includes solid solder 15[.] **However**, Chang lacks . . . **a layer** of highly electrically conductive material **resistant to solder deposition** wherein the layer [is] formed at least over a conductive contact part of the conductive contact member so that the conductive contact part of the conductive contact member may not be contaminated by deposition of solder from the object to be contacted, and wherein **the layer** [is] **essentially consisting** of **an alloy of gold added with silver** . . . .
>
> Onodera et al. teach a contact 110/120 with a contact surface comprising an Au (7-16%), Ag (77-92%), Pd (1-10%) alloy layer in order to provide a contact surface with **a high anti-adhesion property and a highly stable contact resistance** [ ] (see Abstract, Col.4, lines 35-65). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made and **for the same reason** to use AuAg(Pd) alloy, as taught by Onodera et al., in structure of Chang. (Office Action, page 3) (emphases in original).

Appellant agrees with the Examiner that Chang does not disclose or suggest "a layer of highly electrically conductive material resistant to solder deposition . . . formed at least over a conductive contact part of the conductive contact member" as recited in Claims 1, 9, and 10. Chang discloses an electrical test apparatus and method, in particular for ball grid arrays (BGAs), which can provide "reliable connections in all cases" (Chang, col.1, lines 55-56) and "a dependable electrical contact" (Chang, col.2, lines 53-57). Chang even discloses "a needle projection for piercing a solder ball and insuring good electrical contact" (Chang, col.1, lines 53-55). Thus, Chang is directed toward the problem of providing reliable and robust electrical contact for high density BGAs. Appellant submits that Chang does not teach the problem of solder deposition on contact members or the problem source, and there is no basis in the art for combining or modifying Chang with Onodera.

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2402 Michelson Dr.
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Irvine, CA 92612
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The Examiner states that "it would have been obvious to one having ordinary skill in the art at the time the invention was made to use AuAg(Pd) alloy, as taught by Onodera et al., in structure of Chang." (Office Action, page 3).

However, Onodera teaches away from the use of a layer essentially consisting of: 1) gold containing a small amount of silver; or 2) an alloy of gold added with silver; or 3) a homogeneous mixture of gold added with silver. Onodera discloses the following:

> Au and AuAg are so soft as showing a plastic deformation. This plastic deformation may cause a possible adhesion of the contact surface with an opposite contact surface. The adhesion of the contact surface with the opposite contact surface may cause the loss of reliability.
>
> A development of the contact surface layer material having an anti-adhesion property has been made. . . . 1-10% by weight of Pd and 10-100 ppm of C are added to Au or the AuAg alloy to prepare the contact surface layer material, so that the electric contact superior in anti-adhesion property and contact stability is obtained. (Onodera, col.1, ll.30-45).
>
> ...
>
> The present invention provides an electric contact structure comprising a first contact surface and a second contact surface, wherein at least one of the first and second contact surfaces comprises an AuAgPd alloy including 7-16% by weight of Ag and 1-10% by weight of Pd, whereby a high anti-adhesion property and a highly stable contact resistance can be obtained particularly when the electric contacts are in non-operating state. (Onodera, col.3, lines 23-30; Abstract) (emphases added).

Thus, Onodera discloses the use of a gold/silver/palladium alloy for a contact surface layer, in particular for contacts suitable for switches and relays. Onodera teaches that AuAg without Pd may cause the loss of contact reliability and the addition of Pd is at the center of its invention. Accordingly, Onodera teaches away from using a layer essentially consisting of an alloy of gold and silver or a homogeneous mixture of gold added with silver.

Appellant further submits that Onodera does not teach the problem of solder deposition on contact members or the problem source. Onodera does not disclose or suggest material resistant to solder deposition but anti-adhesion characteristics between two like contact surfaces as for relay or switch devices, for example where both the moveable and fixed contacts contain a majority of gold. (Onodera, col.5, line 58-col.8, line 21). Onodera does not disclose or suggest solder or the problem of solder deposition.

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Appellant also submits that Onodera is directed toward nonanalogous art remote from the claimed invention and that a person of ordinary skill in the claimed art would not look to Onodera and its related art to solve the problem treated by the claimed invention. Onodera is wholly unrelated to "a conductive contact member for establishing a temporary electric contact by being applied under a resilient force to an object to be contacted that includes solid solder" as recited in independent Claims 1, 9, and 10.

Appellant thus submits there is no teaching or suggestion in Chang and Onodera (i.e., there is no basis in the art) for combining or modifying Chang with Onodera and that Onodera does not remedy the deficiencies of Chang noted above.

In contrast to the cited references above, Claim 1 recites a "conductive contact member for establishing a temporary electric contact by being applied under a resilient force to an object to be contacted that includes solid solder, comprising a layer of highly electrically conductive material resistant to solder deposition and essentially consisting of gold containing a small amount of silver."

Similarly in contrast, Claim 9 recites a "conductive contact member of a contact probe for establishing a temporary electric contact by being applied under a resilient force to an object to be contacted that includes solid solder, comprising a layer of highly electrically conductive material resistant to solder deposition and essentially consisting of an alloy of gold added with silver."

Similarly in contrast, Claim 10 recites a "conductive contact member of a contact probe for establishing a temporary electric contact by being applied under a resilient force to an object to be contacted that includes solid solder, comprising a layer of highly electrically conductive material resistant to solder deposition and essentially consisting of a homogeneous mixture of gold added with silver."

Therefore, because Chang and Onodera are not properly combinable, and further because Chang and Onodera, alone or in combination, do not disclose or suggest all the limitations of Claims 1, 9, and 10, Claims 1, 9, and 10 are patentable over the cited references.

Claims 2 and 4-7 are dependent on Claim 1 and contain additional limitations that further distinguish them from Chang in view of Onodera. Therefore, Claims 2 and 4-7 are allowable over the cited references for at least the same reasons provided above with respect to Claim 1.

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SUITE 210
Irvine, CA 92612
(949) 752-7040
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2. Chang in view of Onodera and further in view of DiRenzo

Claim 2 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Chang in view of Onodera and further in view of DiRenzo.

In rejecting the claims in the Office Action, the Examiner wrote in part that "DiRenzo teaches pins 12 hav[ing] a layer resistant to solder deposition formed by plating." (Office Action page 5).

Appellant submits that DiRenzo discloses the following:

> [T]he present invention contemplates a method of manufacturing printed circuit boards of the type having a plurality of contact pins projecting from one side thereof, and which pins are adapted for use as wire wrap terminals connecting board-carried wiring to external circuits. The method includes selectively coating portions of the pins . . . with a material to which solder will not adhere to maintain the portions free of solder and in condition for making of wire wrap connections, followed by subjecting the boards and pins to a batch of molten solder to connect the pins to the circuits carried by the board. (DiRenzo, col.1, ll.36-47) (emphasis added).
>
> . . .
>
> Still another method for applying a solder resistant coating comprises electroplating a layer of silver about .000025 inch thick on the gold plated pin to within about one-sixteenth inch of the solder pad. Again this leaves an exposed region of gold to which the solder will adhere. The assembly is then subjected to a hydrogen sulfide enriched atmosphere, whereby the silver coating is converted to silver sulfide which will reject solder during the wave soldering operation. The silver sulfide . . . is conductive and the ensuing wire wrap connection is as effective as if made directly to the untreated gold plated pin surface. (DiRenzo, col.3, ll.22-33) (emphasis added).

Thus, DiRenzo discloses an arrangement for preventing adherence of molten solder onto portions of pins that project from a printed circuit board when the circuit board is immersed or placed over a solder bath. Gold plated pins are disclosed as being selectively electroplated with a layer of silver which is converted to a coating of silver sulfide which is resistant to solder. Portions of the pins not selectively electroplated with the layer of silver is connected to the board circuits by the molten solder. Accordingly, DiRenzo discloses a composite of two layers: a layer of silver sulfide for solder resistance over a layer of gold for solder adherence. DiRenzo does not disclose or suggest a single layer essentially consisting of "gold containing a small amount of silver" formed over a conductive contact part of a

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SUITE 210
Irvine, CA 92612
(949) 752-7040
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conductive contact member, wherein said layer is formed by plating, as covered in independent Claim 1 and dependent Claim 2.

Appellant also submits that DiRenzo is directed toward nonanalogous art remote from the claimed invention and that a person of ordinary skill in the claimed art would not look to DiRenzo and its related art to solve the problem treated by the claimed invention. Appellant further submits that DiRenzo does not teach the problem of solder deposition on contact members or the problem source. As noted above, DiRenzo is directed toward connecting pins of a printed circuit board and providing wire wrap terminal connections. DiRenzo is wholly unrelated to "a conductive contact member for establishing a temporary electric contact by being applied under a resilient force to an object to be contacted that includes solid solder" as recited in independent Claim 1.

Appellant further submits there is no teaching or suggestion in Chang, Onodera, and DiRenzo for combining or modifying the references.

Accordingly, DiRenzo does not remedy the deficiencies of Chang and Onodera noted above, and Claim 2 is dependent on Claim 1 and contains additional limitations that further distinguish it from Chang in view of Onodera and further in view of DiRenzo. Therefore, Claim 2 is allowable over the cited references for at least the same reasons provided above with respect to Claim 1.

3. Chang in view of Onodera and further in view of Loranger

Claim 8 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Chang in view of Onodera and further in view of Loranger.

The Examiner cites Loranger for its disclosure of a compression coil spring 11. As noted by the Examiner in the February 14, 2003 Office Action, "Loranger does not disclose a layer of highly electrically conductive material resistant to solder deposition formed at least over a conductive contact part of the contact member," (Office Action dated 2/14/03, page 5), and thus Loranger does not remedy the deficiencies of Chang and Onodera noted above. Claim 8 is dependent on Claim 1 and contains additional limitations that further distinguish it from Chang in view of Onodera and further in view of Loranger. Therefore, Claim 8 is allowable over the cited references for at least the same reasons provided above with respect to Claim 1.

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MacPHERSON KWOK
CHEN & HEID LLP

2403 Michelson Dr.
SUITE 210
Irvine, CA 92612
(949) 752-7040
FAX (949) 752-7049

VIII. CONCLUSION

For the above reasons, Appellant respectfully submits that the rejection of pending Claims 1-2 and 4-10 is unfounded. Accordingly, Appellant requests that the rejection of Claims 1-2 and 4-10 be reversed.

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Tina Kavanaugh November 2, 2005

Respectfully submitted,

David S. Park
Attorney for Appellant(s)
Reg. No. 52,094

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MacPHERSON KWOK
CHEN & HEID LLP

2402 Michelson Dr.
SUITE 210
Irvine, CA 92612
(949) 752-7040
FAX (949) 752-7049

APPENDIX

1. A conductive contact member for establishing a temporary electric contact by being applied under a resilient force to an object to be contacted that includes solid solder, comprising a layer of highly electrically conductive material resistant to solder deposition and essentially consisting of gold containing a small amount of silver, the layer being formed at least over a conductive contact part of said conductive contact member so that said conductive contact part of said conductive contact member may not be contaminated by deposition of solder from said object to be contacted.

2. A conductive contact member according to claim 1, wherein said layer is formed by plating.

3. (canceled)

4. A conductive contact member according to claim 1, wherein silver is added to gold by 0.01% to 8%.

5. A conductive contact member according to claim 1, wherein said conductive contact member is selected from the group consisting of a coil, needle member having a pointed end, and rod member having a flat end.

6. A conductive contact member according to claim 1, wherein said conductive contact member is made of steel.

7. A conductive contact member according to claim 1, wherein said conductive contact member is in the form of a compression coil spring, and said solder resistant layer is formed around a coil wire forming said coil spring.

8. A conductive contact member according to claim 1, wherein said conductive contact member is in the form of a compression coil spring having a contact part consisting of closely wound turns of a coil wire, and said solder resistant layer is formed over an outer surface of said closely wound turns of the coil wire.

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SUITE 210
Irvine, CA 92612
(949) 752-7040
FAX (949) 752-7049

9. A conductive contact member of a contact probe for establishing a temporary electric contact by being applied under a resilient force to an object to be contacted that includes solid solder, comprising a layer of highly electrically conductive material resistant to solder deposition and essentially consisting of an alloy of gold added with silver, the layer being formed at least over a conductive contact part of said conductive contact member so that said conductive contact part of said conductive contact member may not be contaminated by deposition of solder from said object to be contacted.

10. A conductive contact member of a contact probe for establishing a temporary electric contact by being applied under a resilient force to an object to be contacted that includes solid solder, comprising a layer of highly electrically conductive material resistant to solder deposition and essentially consisting of a homogeneous mixture of gold added with silver, the layer being formed at least over a conductive contact part of said conductive contact member so that said conductive contact part of said conductive contact member may not be contaminated by deposition of solder from said object to be contacted.

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MacPHERSON KWOK
CHEN & HEID LLP

2402 Michelson Dr.
SUITE 210
Irvine, CA 92612
(949) 752-7040
FAX (949) 752-7049